

# Production of Round Balers



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8th grade math (pre-algebra)  
Evans Middle School, Ottumwa  
John Deere Ottumwa Works

## Part I: Overview of Business

- In 1911, John Deere purchased the site it is at now in Ottumwa making it Deere’s first manufacturing facility in Iowa!
- It designs and manufactures round balers, large/small square balers, self-propelled windrowers, and mower conditioners
- The factory sits on 120 acres

## Part II: Job Specifics

- There are various work areas that a piece of equipment goes through before being complete (Welding, Assembly, Paint, Pack-Out, and Warehouse).
- As a piece of equipment moves through those work areas, workers inspect the machine to ensure quality.
- As the piece of machinery moves from one work area to another, it is time stamped as complete for that particular work center

[Intro video of John Deere Ottumwa](#) (stop at 1:30; start back up 2:39-3:20)  
[Video of Round Baler](#)

## Part III: Introduce the Problem

- When looking at a particular work area, a module leader or business unit manager might ask is each work center going to meet their scheduled goal of completed machines for the day. If not, what got in the way of daily production? If, so what was the production rate and could we schedule more machines to be completed in a day

## Part IV: Background

- Students would need to know
- rate of change (how to calculate it, interpret it, and make predictions based off of it)
  - How to organize data in a table and graph using or not using technology

## Part V: Business Solution

- A module leader or business unit manager would look at an online tool, give certain parameters, and review the data
- If there was an issue with production, that would be discussed at a daily or weekly meeting

## Part VI: Student Solutions

- Graph: decide if it shows a constant rate of change and how that relates to linearity  
[solutions with graph](#)
- Table: find the rate of change between timestamps to justify if there is a constant rate of change and interpret what the rate of change means  
[solutions/data with table](#)
- Use either the table or graph to make a prediction about if the work area will meet its scheduled goal for the day

# Can we meet our scheduled goal for Round Balers?

You are given the following report showing how many machines are supposed to be completed today. Your focus is to look only at the Round Baler production. In fact, each class will be calculating and interpreting a different work area. With a partner use the data given to you to decide if your specific work area will meet their goal for the day. Feel free to use technology to help you.

Ottumwa Works - Daily Manufacturing Report							
Production status through 11:00 pm				6/28/2018			
Schedule	RB	SSB	LSB	6/8	9	SPW	Total
Weld	34	0	1	6	5	3	49
Gray	34	0	1	6	5	3	49
Paint	34	0	1	6	5	3	49
Packout	34	0	1	6	5	3	49
Warehouse	35	0	1	8	5	3	52

# 1st period: Welding

A	B	C	D	E	F
MES Order	Work Cent	Status	Operation	Log Date	Log Time
14003635362	33AX	S	6/25/2018	6/26/2018	8:51 PM
14003635364	33AX	S	6/25/2018	6/26/2018	9:28 PM
14003635293	33AX	S	6/25/2018	6/26/2018	9:32 PM
14003635373	33AX	S	6/25/2018	6/26/2018	10:16 PM
14003635282	33AX	S	6/25/2018	6/26/2018	10:18 PM
14003635361	33AX	S	6/25/2018	6/26/2018	11:08 PM
14003635365	33AX	S	6/25/2018	6/26/2018	11:34 PM
14003635289	33AX	S	6/25/2018	6/26/2018	11:55 PM
14003635371	33AX	S	6/25/2018	6/27/2018	12:09 AM
14003635379	33AX	S	6/25/2018	6/27/2018	12:54 AM
14003635380	33AX	S	6/25/2018	6/27/2018	1:32 AM

Here are the first 11 machines scanned at your work area, will you meet your scheduled goal? Use your worksheet to guide you in your decision.  
Reminder your scheduled goal is below.

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Ottumwa Works - Daily Manufacturing Report

Production status through 11:00 pm6/28/2018

Schedule	RB	SSB	LSB	6/8	9	SPW	Total
Weld	34	0	1	6	5	3	49
Gray	34	0	1	6	5	3	49
Paint	34	0	1	6	5	3	49
Packout	34	0	1	6	5	3	49
Warehouse	35	0	1	8	5	3	52

[worksheet](#)

# 2nd period: Assembly

MES Order	Work Cent	Status	Operation	Log Date	Log Time
14003633785	26JG0600	S	6/22/2018	6/26/2018	9:04 PM
14003635295	26JG0600	S	6/25/2018	6/26/2018	9:31 PM
14003635296	26JG0600	S	6/25/2018	6/26/2018	9:57 PM
14003635294	26JG0600	S	6/25/2018	6/26/2018	10:23 PM
14003635359	26JG0600	S	6/25/2018	6/26/2018	10:51 PM
14003635278	26JG0600	S	6/25/2018	6/26/2018	11:17 PM
14003635362	26JG0600	S	6/25/2018	6/26/2018	11:44 PM
14003635374	26JG0600	S	6/25/2018	6/27/2018	12:12 AM
14003635372	26JG0600	S	6/25/2018	6/27/2018	12:37 AM
14003635293	26JG0600	S	6/25/2018	6/27/2018	1:33 AM
14003635297	26JG0600	S	6/25/2018	6/27/2018	1:58 AM

Here are the first 11 machines scanned at your work area, will you meet your scheduled goal? Use your worksheet to guide you in your decision.  
Reminder your scheduled goal is below.

Ottumwa Works - Daily Manufacturing Report							
Production status through 11:00 pm				6/28/2018			
Schedule	RB	SSB	LSB	6/8	9	SPW	Total
Weld	34	0	1	6	5	3	49
Gray	34	0	1	6	5	3	49
Paint	34	0	1	6	5	3	49
Packout	34	0	1	6	5	3	49
Warehouse	35	0	1	8	5	3	52

[worksheet](#)



# 3rd period: Paint

MES Order	Order Mat	Work Cen	Status	Operation	Log Date	Log Time
14003629954	2371E	75JS	S	6/21/2018	6/27/2018	1:35 AM
14003633758	2370E	75JS	S	6/26/2018	6/27/2018	7:09 AM
14003627385	2340E	75JS	S	6/25/2018	6/27/2018	7:25 AM
14003632544	2341E	75JS	S	6/25/2018	6/27/2018	7:32 AM
14003633746	2370E	75JS	S	6/26/2018	6/27/2018	7:41 AM
14003628791	2340E	75JS	S	6/26/2018	6/27/2018	7:53 AM
14003633759	2370E	75JS	S	6/26/2018	6/27/2018	8:01 AM
14003627372	2340E	75JS	S	6/25/2018	6/27/2018	8:07 AM
14003627378	2340E	75JS	S	6/25/2018	6/27/2018	8:30 AM
14003633748	2370E	75JS	S	6/26/2018	6/27/2018	8:47 AM
14003633744	2370E	75JS	S	6/26/2018	6/27/2018	9:03 AM

Here are the first 11 machines scanned at your work area, will you meet your scheduled goal? Use your worksheet to guide you in your decision.  
Reminder your scheduled goal is below.

I							
Ottumwa Works - Daily Manufacturing Report							
T Production status through 11:00 pm 6/28/2018							
Schedule	RB	SSB	LSB	6/8	9	SPW	Total
Weld	34	0	1	6	5	3	49
Gray	34	0	1	6	5	3	49
Paint	34	0	1	6	5	3	49
Packout	34	0	1	6	5	3	49
Warehouse	35	0	1	8	5	3	52

[worksheet](#)

# 5th period: Pack-Out

MES Order	Work Cent	Status	Operation	Log Date	Log Time
14003629940	26JP1200	S	6/22/2018	6/26/2018	9:20 PM
14003629889	26JP1200	S	6/22/2018	6/26/2018	9:47 PM
14003629896	26JP1200	S	6/22/2018	6/26/2018	10:14 PM
14003629897	26JP1200	S	6/22/2018	6/26/2018	10:44 PM
14003629944	26JP1200	S	6/22/2018	6/26/2018	11:08 PM
14003629946	26JP1200	S	6/22/2018	6/26/2018	11:51 PM
14003629986	26JP1200	S	6/22/2018	6/27/2018	12:24 AM
14003629957	26JP1200	S	6/22/2018	6/27/2018	12:49 AM
14003629950	26JP1200	S	6/22/2018	6/27/2018	1:59 AM
14003629939	26JP1200	S	6/22/2018	6/27/2018	2:27 AM
14003629949	26JP1200	S	6/22/2018	6/27/2018	3:04 AM

Here are the first 11 machines scanned at your work area, will you meet your scheduled goal? Use your worksheet to guide you in your decision.  
Reminder your scheduled goal is below.

I <b>Ottumwa Works - Daily Manufacturing Report</b>							
T Production status through 11:00 pm				6/28/2018			
Schedule	RB	SSB	LSB	6/8	9	SPW	Total
Weld	34	0	1	6	5	3	49
Gray	34	0	1	6	5	3	49
Paint	34	0	1	6	5	3	49
Packout	34	0	1	6	5	3	49
Warehouse	35	0	1	8	5	3	52

[worksheet](#)

# 6th period: Warehouse

MES Order	Work Cent	Status	Operation	Log Date	Log Time
14003629896	QMRB	S	6/22/2018	6/26/2018	10:14 PM
14003629897	QMRB	S	6/22/2018	6/26/2018	10:44 PM
14003629957	QMRB	S	6/22/2018	6/27/2018	12:49 AM
14003629939	QMRB	S	6/22/2018	6/27/2018	2:27 AM
14003629949	QMRB	S	6/22/2018	6/27/2018	3:04 AM
14003629948	QMRB	S	6/22/2018	6/27/2018	3:32 AM
14003621444	QMRB	S	6/13/2018	6/27/2018	3:41 AM
14003629951	QMRB	S	6/22/2018	6/27/2018	4:30 AM
14003627407	QMRB	S	6/20/2018	6/27/2018	4:57 AM
14003629983	QMRB	S	6/22/2018	6/27/2018	5:07 AM
14003626187	QMRB	S	6/22/2018	6/27/2018	5:36 AM

Here are the first 11 machines scanned at your work area, will you meet your scheduled goal? Use your worksheet to guide you in your decision.  
Reminder your scheduled goal is below.

Ottumwa Works - Daily Manufacturing Report							
Production status through 11:00 pm				6/28/2018			
Schedule	RB	SSB	LSB	6/8	9	SPW	Total
Weld	34	0	1	6	5	3	49
Gray	34	0	1	6	5	3	49
Paint	34	0	1	6	5	3	49
Packout	34	0	1	6	5	3	49
Warehouse	35	0	1	8	5	3	52

[worksheet](#)

# Solutions Page



## Ottumwa Works - Daily Manufacturing Report

Production status through 11:00 pm

6/28/2018

Units Produced	RB	SSB	LSB	6/8	9	SPW	Total
Weld	36	0	0	7	5	3	51
Gray	38	0	0	6	5	3	52
Paint	32	0	0	7	7	4	50
Packout	32	0	2	7	5	2	48
Warehouse	44	0	1	6	5	2	58

Schedule	RB	SSB	LSB	6/8	9	SPW	Total
Weld	34	0	1	6	5	3	49
Gray	34	0	1	6	5	3	49
Paint	34	0	1	6	5	3	49
Packout	34	0	1	6	5	3	49
Warehouse	35	0	1	8	5	3	52

# Weld

Scheduled to complete 34, but ACTUALLY completed 36; finished production at 3:46 pm

Solved by using the table:

- 1) Would have completed 34 machines by 12:16 pm using a ROC of 28 min/machine  
Could have completed 13 more
- 2) Would have completed 34 machines by 1:02 pm using a ROC of 30 min/machine (took out the smallest ROC to get a better average ROC)  
Could have completed 11 more

Solved by using the graph:

Completed 34 machines by 12:28 pm (24.47 in desmos)  
Could have completed 13/14 more

Actual data for the day:

Plant	MES Order	Order Material	Work Center	Operation /Action Point	Status	Operation	Log Date	Log Time	Production Scheduler				
EX01	140036353	2370E	33AX	0150	S	6/25/2018	6/26/2018	8:51:52 PM	BRB	0:36			
EX01	140036353	2370E	33AX	0150	S	6/25/2018	6/26/2018	9:28:27 PM	BRB	0:04			
EX01	140036352	2370E	33AX	0150	S	6/25/2018	6/26/2018	9:32:53 PM	BRB	0:43			
EX01	140036353	2370E	33AX	0150	S	6/25/2018	6/26/2018	10:16:32 PM	BRB	0:02			
EX01	140036352	2370E	33AX	0150	S	6/25/2018	6/26/2018	10:18:48 PM	BRB	0:49			
EX01	140036353	2370E	33AX	0150	S	6/25/2018	6/26/2018	11:08:02 PM	BRB	0:26			
EX01	140036353	2370E	33AX	0150	S	6/25/2018	6/26/2018	11:34:27 PM	BRB	0:21			
EX01	140036352	2370E	33AX	0150	S	6/25/2018	6/26/2018	11:55:50 PM	BRB	0:13			
EX01	140036353	2371E	33AX	0150	S	6/25/2018	6/27/2018	12:09:36 AM	BRB	0:44			
EX01	140036353	2371E	33AX	0150	S	6/25/2018	6/27/2018	12:54:01 AM	BRB	0:38			
EX01	140036353	2371E	33AX	0150	S	6/25/2018	6/27/2018	1:32:55 AM	BRB	0:07			
EX01	140036353	2371E	33AX	0150	S	6/25/2018	6/27/2018	1:40:33 AM	BRB	0:38			
EX01	140036353	2371E	33AX	0150	S	6/25/2018	6/27/2018	2:19:24 AM	BRB	0:00			
EX01	140036261	2371E	33AX	0150	S	6/25/2018	6/27/2018	2:20:22 AM	BRB	0:34			
EX01	140036352	2370E	33AX	0150	S	6/25/2018	6/27/2018	2:54:37 AM	BRB	0:48			
EX01	140036274	2371E	33AX	0150	S	6/25/2018	6/27/2018	3:43:18 AM	BRB	0:05			
EX01	140036353	2371E	33AX	0150	S	6/25/2018	6/27/2018	3:48:42 AM	BRB	2:08			
EX01	140036274	2371E	33AX	0150	S	6/25/2018	6/27/2018	5:56:47 AM	BRB	2:05			
EX01	140036274	2371E	33AX	0150	S	6/25/2018	6/27/2018	8:02:38 AM	BRB	0:01			
EX01	140036274	2371E	33AX	0150	S	6/25/2018	6/27/2018	8:04:30 AM	BRB	0:42			
EX01	140036274	2371E	33AX	0150	S	6/26/2018	6/27/2018	8:46:34 AM	BRB	0:11			
EX01	140036274	2371E	33AX	0150	S	6/26/2018	6/27/2018	8:58:01 AM	BRB	0:29			
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	9:27:13 AM	BRB	0:57			
EX01	140036367	2371E	33AX	0150	S	6/26/2018	6/27/2018	10:24:32 AM	BRB	0:05			
EX01	140036367	2371E	33AX	0150	S	6/26/2018	6/27/2018	10:29:55 AM	BRB	0:32			
EX01	140036367	2371E	33AX	0150	S	6/26/2018	6/27/2018	11:02:31 AM	BRB	0:30			
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	11:32:58 AM	BRB	0:16			
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	11:49:07 AM	BRB	0:59			Average:
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	12:48:31 PM	BRB	0:21			0:32
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	1:09:36 PM	BRB	0:27			
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	1:36:55 PM	BRB	0:29			
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	2:06:46 PM	BRB	0:26			
EX01	140036367	2371E	33AX	0150	S	6/26/2018	6/27/2018	2:33:04 PM	BRB	0:32			
EX01	140036367	2371E	33AX	0150	S	6/26/2018	6/27/2018	3:05:19 PM	BRB	0:14			
EX01	140036367	2371E	33AX	0150	S	6/26/2018	6/27/2018	3:20:12 PM	BRB	0:25			
EX01	140036366	2371E	33AX	0150	S	6/26/2018	6/27/2018	3:46:08 PM	BRB				



# Grey

Scheduled to complete 34, but ACTUALLY completed 38; finished production at 3:03 pm

Solved by using the table:

- 1) Would have completed 34 machines by 1:28 pm using a ROC of 30 min/machine  
Could have completed 9 more

Solved by using the graph:

Completed 34 machines by 12:29 pm (24.48 in desmos)  
Could have completed 14 more

Actual data for the day:

Plant	MES Order	Order Material	Work Center	Operation /Action Point	Status	Operation	Log Date	Log Time	Production Scheduler			
EX01	140036337	2370E	26JG0600	0200	S	6/22/2018	6/26/2018	9:04:39 PM	BRB	0:26		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/26/2018	9:31:14 PM	BRB	0:25		
EX01	140036352	2370E	26JG0600	0200	F	6/25/2018	6/26/2018	9:57:09 PM	BRB	0:00		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/26/2018	9:57:42 PM	BRB	0:26		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/26/2018	10:23:50 PM	BRB	0:27		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/26/2018	10:51:08 PM	BRB	0:26		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/26/2018	11:17:42 PM	BRB	0:26		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/26/2018	11:44:02 PM	BRB	0:28		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	12:12:58 AM	BRB	0:24		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	12:37:44 AM	BRB	0:55		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	1:33:14 AM	BRB	0:25		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	1:58:21 AM	BRB	0:26		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	2:24:34 AM	BRB	0:25		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	2:50:33 AM	BRB	0:23		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	3:14:10 AM	BRB	0:22	Average:	
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	3:37:08 AM	BRB	0:41	0:29	
EX01	140036353	2370E	26JG0600	0200	F	6/25/2018	6/27/2018	4:18:11 AM	BRB	0:00		
EX01	140036353	2370E	26JG0600	0200	F	6/25/2018	6/27/2018	4:18:21 AM	BRB	0:00		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	4:19:10 AM	BRB	0:24		
EX01	140036353	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	4:43:29 AM	BRB	0:19		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	5:03:07 AM	BRB	0:22		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	5:25:56 AM	BRB	2:11		
EX01	140036353	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	7:37:47 AM	BRB	0:31		
EX01	140036353	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	8:09:32 AM	BRB	0:30		
EX01	140036353	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	8:39:41 AM	BRB	0:29		
EX01	140036287	2380E	26JG0600	0200	S	6/22/2018	6/27/2018	9:09:22 AM	BRB	0:44		
EX01	140036261	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	9:54:01 AM	BRB	0:24		
EX01	140036274	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	10:18:57 AM	BRB	0:42		
EX01	140036353	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	11:01:55 AM	BRB	0:15		
EX01	140036353	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	11:17:36 AM	BRB	0:24		
EX01	140036274	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	11:41:46 AM	BRB	0:58		
EX01	140036274	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	12:40:08 PM	BRB	0:32		
EX01	140036274	2371E	26JG0600	0200	S	6/25/2018	6/27/2018	1:12:45 PM	BRB	0:28		
EX01	140036274	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	1:40:47 PM	BRB	0:26		
EX01	140036274	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	2:07:20 PM	BRB	0:30		
EX01	140036366	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	2:38:04 PM	BRB	0:25		
EX01	140036366	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	2:38:04 PM	BRB	0:25		
EX01	140036367	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	3:03:41 PM	BRB	0:23		
EX01	140036367	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	3:26:42 PM	BRB	0:37		
EX01	140036366	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	4:03:50 PM	BRB	0:24		
EX01	140036352	2370E	26JG0600	0200	S	6/25/2018	6/27/2018	4:28:47 PM	BRB	0:30		
EX01	140036366	2371E	26JG0600	0200	S	6/26/2018	6/27/2018	4:58:47 PM	BRB			

# Paint

Scheduled to complete 34, but ACTUALLY completed 32; finished production at 3:47 pm

Solved by using the table:

- 1) Would have only completed 23 by 7 pm deadline using a ROC of 46 min/machine
- 2) Would have completed 34 machines by 2:11 pm using a ROC of 14 min/machine (took out the first data point to get a better average ROC)  
Could have completed 23 more
- 3) Would have only completed 30 machines by 7 pm deadline using a ROC of 30min/machine

Solved by using the graph:

completed 34 machines by 2:05 pm (14.08 in desmos)  
Could have completed 23 more

Actual data for the day:

Plant	MES Order	Order Mat#	Work Cent	Operation /Action Point	Status	Operation	Log Date	Log Time	Production Scheduler			
EX01	140036299	2371E	75JS	0350	S	6/21/2018	6/27/2018	1:35:30 AM	BRB	5:33		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	7:09:10 AM	BRB	0:16		
EX01	140036273	2340E	75JS	0350	S	6/25/2018	6/27/2018	7:25:20 AM	BRB	0:07		
EX01	140036325	2341E	75JS	0350	S	6/25/2018	6/27/2018	7:32:32 AM	BRB	0:08		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	7:41:16 AM	BRB	0:12		
EX01	140036287	2340E	75JS	0350	S	6/26/2018	6/27/2018	7:53:40 AM	BRB	0:07		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	8:01:09 AM	BRB	0:06		
EX01	140036273	2340E	75JS	0350	S	6/25/2018	6/27/2018	8:07:31 AM	BRB	0:22	Average:	
EX01	140036273	2340E	75JS	0350	S	6/25/2018	6/27/2018	8:30:18 AM	BRB	0:17	0:25	
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	8:47:40 AM	BRB	0:15		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	9:03:26 AM	BRB	0:15		
EX01	140036274	2341E	75JS	0350	S	6/19/2018	6/27/2018	9:18:38 AM	BRB	0:06		
EX01	140036337	2370E	75JS	0350	F	6/26/2018	6/27/2018	9:24:51 AM	BRB	0:00		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	9:25:12 AM	BRB	0:47		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	10:12:58 AM	BRB	0:15		
EX01	140036311	2310E	75JS	0350	S	6/22/2018	6/27/2018	10:28:20 AM	BRB	0:11		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	10:39:47 AM	BRB	0:32		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	11:12:41 AM	BRB	0:06		
EX01	140036352	2370E	75JS	0350	S	6/27/2018	6/27/2018	11:18:41 AM	BRB	0:18		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	11:37:16 AM	BRB	0:05		
EX01	140036352	2370E	75JS	0350	S	6/27/2018	6/27/2018	11:42:25 AM	BRB	0:07		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	11:50:06 AM	BRB	0:50		
EX01	140036352	2370E	75JS	0350	S	6/27/2018	6/27/2018	12:40:58 PM	BRB	0:06		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	12:47:36 PM	BRB	0:05		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	12:53:09 PM	BRB	0:12		
EX01	140036352	2370E	75JS	0350	F	6/27/2018	6/27/2018	1:05:56 PM	BRB	0:00		
EX01	140036352	2370E	75JS	0350	S	6/27/2018	6/27/2018	1:06:22 PM	BRB	0:13		
EX01	140036337	2370E	75JS	0350	F	6/26/2018	6/27/2018	1:19:26 PM	BRB	0:00		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	1:19:45 PM	BRB	0:43		
EX01	140036352	2370E	75JS	0350	S	6/27/2018	6/27/2018	2:03:43 PM	BRB	0:05		
EX01	140036337	2370E	75JS	0350	S	6/26/2018	6/27/2018	2:09:10 PM	BRB	0:18		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	2:27:23 PM	BRB	0:25		
EX01	140036353	2371E	75JS	0350	S	6/27/2018	6/27/2018	2:52:41 PM	BRB	0:27		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	3:20:35 PM	BRB	0:27		
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	3:47:54 PM	BRB			
EX01	140036353	2370E	75JS	0350	S	6/27/2018	6/27/2018	3:47:54 PM	BRB			



# Pack-Out

Scheduled to complete 34, but ACTUALLY completed 32; finished production at 5:09 pm

Solved by using the table:

1) Would have completed 34 by 4:06 pm using a ROC of 34 min/machine  
Could have completed 4 more

2) Would have completed 34 machines by 2:34 pm using a ROC of 30 min/machine (took out biggest ROC to get a better average of ROC)  
Could have completed 8 more

Solved by using the graph:

completed 34 machines by 3:04 pm (27.06 in desmos)  
Could have completed 7 more

Actual data for the day:

Plant	MES Order	Order Material	Work Center	Operation /Action Point	Status	Operation	Log Date	Log Time	Production Scheduler			
EX01	140036299	2370E	26JP1200	0400	S	6/22/2018	6/26/2018	9:20:29 PM	BRB	0:27		
EX01	140036298	2370E	26JP1200	0400	S	6/22/2018	6/26/2018	9:47:40 PM	BRB	0:27		
EX01	140036298	2370E	26JP1200	0400	S	6/22/2018	6/26/2018	10:14:47 PM	BRB	0:29		
EX01	140036298	2370E	26JP1200	0400	S	6/22/2018	6/26/2018	10:44:36 PM	BRB	0:23		
EX01	140036299	2370E	26JP1200	0400	S	6/22/2018	6/26/2018	11:08:16 PM	BRB	0:43		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/26/2018	11:51:16 PM	BRB	0:33		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	12:24:48 AM	BRB	0:24		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	12:49:42 AM	BRB	1:09		Average:
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	1:59:08 AM	BRB	0:28		0:38
EX01	140036299	2370E	26JP1200	0400	S	6/22/2018	6/27/2018	2:27:26 AM	BRB	0:37		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	3:04:39 AM	BRB	0:27		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	3:31:58 AM	BRB	0:58		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	4:30:38 AM	BRB	0:36		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	5:07:02 AM	BRB	0:29		
EX01	140036261	12371E	26JP1200	0400	S	6/22/2018	6/27/2018	5:36:30 AM	BRB	0:30		
EX01	140036261	12371E	26JP1200	0400	S	6/22/2018	6/27/2018	6:06:48 AM	BRB	0:30		
EX01	140036261	12371E	26JP1200	0400	S	6/22/2018	6/27/2018	6:37:14 AM	BRB	1:03		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	7:41:06 AM	BRB	0:27		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	8:08:57 AM	BRB	0:36		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	8:45:36 AM	BRB	0:32		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	9:18:12 AM	BRB	0:53		
EX01	140036299	2371E	26JP1200	0400	S	6/22/2018	6/27/2018	10:11:56 AM	BRB	0:51		
EX01	140036138	2320E	26JP1200	0400	S	6/11/2018	6/27/2018	11:03:21 AM	BRB	0:41		
EX01	140036193	2320E	26JP1200	0400	S	6/18/2018	6/27/2018	11:44:54 AM	BRB	1:10		
EX01	140036205	2320E	26JP1200	0400	S	6/18/2018	6/27/2018	12:55:09 PM	BRB	0:31		
EX01	140036205	2320E	26JP1200	0400	S	6/18/2018	6/27/2018	1:26:47 PM	BRB	0:44		
EX01	140036193	2320E	26JP1200	0400	S	6/18/2018	6/27/2018	2:11:30 PM	BRB	0:36		
EX01	140036205	2320E	26JP1200	0400	S	6/18/2018	6/27/2018	2:47:55 PM	BRB	0:38		
EX01	140036205	2340E	26JP1200	0400	S	6/12/2018	6/27/2018	3:26:47 PM	BRB	0:30		
EX01	140036261	12341E	26JP1200	0400	S	6/19/2018	6/27/2018	3:56:51 PM	BRB	0:36		
EX01	140036261	12341E	26JP1200	0400	S	6/19/2018	6/27/2018	4:33:36 PM	BRB	0:35		
EX01	140036274	12341E	26JP1200	0400	S	6/20/2018	6/27/2018	5:09:16 PM	BRB			

# Warehouse

Scheduled to complete 35, but ACTUALLY completed 44; finished production at 6:54 pm

Solved by using the table:

- 1) Would have only completed 32 by 7 pm deadline using a ROC of 38 min/machine
- 2) Would have completed 35 machines by 6 pm using a ROC of 31 min/machine (took out the first data point to get a better average ROC)  
Could have completed 1 more

Solved by using the graph:  
completed 35 machines past deadline at 9:45 pm (33.75 in desmos)  
Could only make 31 by 7pm

Actual data for the day:

Plant	MES Order	Order Mate	Work Cent	Operation /Action Point	Status	Operation	Log Date	Log Time	Productio n Scheduler			
EX01	14003629896	2370E	QMRB	0500	S	6/22/2018	6/26/2018	10:14:48 PM	BRB	0:08		
EX01	14003629889	2370E	QMRB	0500	F	6/22/2018	6/26/2018	10:23:31 PM	BRB	0:21		
EX01	14003629897	2370E	QMRB	0500	S	6/22/2018	6/26/2018	10:44:37 PM	BRB	1:05		
EX01	14003629957	2371E	QMRB	0500	S	6/22/2018	6/27/2018	12:49:43 AM	BRB	1:37		average:
EX01	14003629939	2370E	QMRB	0500	S	6/22/2018	6/27/2018	2:27:27 AM	BRB	0:37		0:24
EX01	14003629949	2371E	QMRB	0500	S	6/22/2018	6/27/2018	3:04:40 AM	BRB	0:27		
EX01	14003629948	2371E	QMRB	0500	S	6/22/2018	6/27/2018	3:32:00 AM	BRB	0:09		
EX01	14003621444	2370E	QMRB	0500	S	6/13/2018	6/27/2018	3:41:45 AM	BRB	0:48		
EX01	14003629951	2371E	QMRB	0500	S	6/22/2018	6/27/2018	4:30:39 AM	BRB	0:27		
EX01	14003627407	2341E	QMRB	0500	S	6/20/2018	6/27/2018	4:57:52 AM	BRB	0:09		
EX01	14003629983	2371E	QMRB	0500	S	6/22/2018	6/27/2018	5:07:06 AM	BRB	0:29		
EX01	14003626187	2371E	QMRB	0500	S	6/22/2018	6/27/2018	5:36:32 AM	BRB	1:04		
EX01	14003608214	2320E	QMRB	0500	S	6/5/2018	6/27/2018	6:41:01 AM	BRB	1:00		
EX01	14003629952	2371E	QMRB	0500	S	6/22/2018	6/27/2018	7:41:08 AM	BRB	0:02		
EX01	14003609559	2370E	QMRB	0500	S	5/31/2018	6/27/2018	7:43:34 AM	BRB	0:00		
EX01	14003612520	2320E	QMRB	0500	S	6/4/2018	6/27/2018	7:44:08 AM	BRB	0:00		
EX01	14003619280	2321E	QMRB	0500	S	6/11/2018	6/27/2018	7:44:42 AM	BRB	0:00		
EX01	14003612758	2340E	QMRB	0500	S	6/6/2018	6/27/2018	7:45:25 AM	BRB	0:00		
EX01	14003624761	2320E	QMRB	0500	F	6/18/2018	6/27/2018	7:46:17 AM	BRB	0:00		
EX01	14003624828	2321E	QMRB	0500	S	6/18/2018	6/27/2018	7:46:46 AM	BRB	0:01		
EX01	14003624761	2320E	QMRB	0500	F	6/18/2018	6/27/2018	7:47:48 AM	BRB	0:00		
EX01	14003624761	2320E	QMRB	0500	S	6/18/2018	6/27/2018	7:48:10 AM	BRB	0:02		
EX01	14003629889	2370E	QMRB	0500	S	6/22/2018	6/27/2018	7:51:00 AM	BRB	0:17		
EX01	14003629953	2371E	QMRB	0500	S	6/22/2018	6/27/2018	8:08:58 AM	BRB	0:04		
EX01	14003628800	2370E	QMRB	0500	F	6/21/2018	6/27/2018	8:13:03 AM	BRB	0:00		
EX01	14003629944	2370E	QMRB	0500	S	6/22/2018	6/27/2018	8:13:07 AM	BRB	0:29		
EX01	14003621463	2370E	QMRB	0500	S	6/13/2018	6/27/2018	8:42:44 AM	BRB	0:02		
EX01	14003629980	2371E	QMRB	0500	S	6/22/2018	6/27/2018	8:45:37 AM	BRB	0:10		
EX01	14003628692	2370E	QMRB	0500	S	6/21/2018	6/27/2018	8:56:17 AM	BRB	0:07		
EX01	14003629940	2370E	QMRB	0500	S	6/22/2018	6/27/2018	9:04:06 AM	BRB	0:07		
EX01	14003628772	2370E	QMRB	0500	S	6/21/2018	6/27/2018	9:11:13 AM	BRB	0:37		
EX01	14003628796	2370E	QMRB	0500	S	6/21/2018	6/27/2018	9:48:56 AM	BRB	0:01		
EX01	14003628800	2370E	QMRB	0500	S	6/21/2018	6/27/2018	9:50:25 AM	BRB	0:00		
EX01	14003628801	2370E	QMRB	0500	S	6/21/2018	6/27/2018	9:50:54 AM	BRB	0:21		
EX01	14003629958	2371E	QMRB	0500	S	6/22/2018	6/27/2018	10:11:58 AM	BRB	0:51		
EX01	14003613880	2320E	QMRB	0500	F	6/12/2018	6/27/2018	11:03:22 AM	BRB	0:17		
EX01	14003613880	2320E	QMRB	0500	S	6/12/2018	6/27/2018	11:20:31 AM	BRB	0:21		
EX01	14003629954	2371E	QMRB	0500	S	6/22/2018	6/27/2018	11:42:29 AM	BRB	1:21		
EX01	14003629954	2371E	QMRB	0500	S	6/22/2018	6/27/2018	11:42:29 AM	BRB	1:21		
EX01	14003620581	2320E	QMRB	0500	S	6/18/2018	6/27/2018	1:04:28 PM	BRB	0:22		
EX01	14003620583	2320E	QMRB	0500	S	6/18/2018	6/27/2018	1:26:48 PM	BRB	1:21		
EX01	14003620591	2320E	QMRB	0500	S	6/18/2018	6/27/2018	2:47:56 PM	BRB	1:08		
EX01	14003626162	2341E	QMRB	0500	S	6/19/2018	6/27/2018	3:56:52 PM	BRB	0:36		
EX01	14003626163	2341E	QMRB	0500	S	6/19/2018	6/27/2018	4:33:37 PM	BRB	0:08		
EX01	14003628770	2370E	QMRB	0500	S	6/21/2018	6/27/2018	4:42:24 PM	BRB	0:07		
EX01	14003622709	2371E	QMRB	0500	S	6/14/2018	6/27/2018	4:50:08 PM	BRB	0:19		
EX01	14003628797	2370E	QMRB	0500	S	6/21/2018	6/27/2018	5:09:40 PM	BRB	1:03		
EX01	14003620579	2320E	QMRB	0500	S	6/18/2018	6/27/2018	6:13:22 PM	BRB	0:40		
EX01	14003628767	2370E	QMRB	0500	S	6/21/2018	6/27/2018	6:53:34 PM	BRB	0:01		
EX01	14003620586	2340E	QMRB	0500	S	6/13/2018	6/27/2018	6:54:44 PM	BRB			
EX01	14003620586	2340E	QMRB	0500	S	6/13/2018	6/27/2018	6:54:44 PM	BRB			